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REMARKS

Applicants thank the Examiner for the consideration given the present application. By the present Amendment, claims 4 and 5 are cancelled without prejudice or disclaimer. Applicants reserve the right to file one or more continuing applications directed to the subject matter of such claims. Claims 1-3 and 6-9 are pending, of which claim 1 is independent and is amended, and claims 7-9 are added to provide Applicants with the coverage to which they are deemed entitled. Attention is invited to the original specification at page 9, lines 21-23, and page 10, lines 21-24.

Reconsideration is requested of the rejections of claims 1-6 under 35 U.S.C. §102(b) as being anticipated by Grace et al. (U.S. 4,892,893), Ricciardi et al. (U.S. 4,757,093), Haas et al. (U.S. 5,104,905), Smiecinski et al. (U.S. 5,830,926), GB 2,369,825, and WO 03/078497.

Without acquiescing to any ground of rejection, but merely to advance prosecution, independent claim 1 is amended to recite a composition for a flame-retardant, flexible polyurethane foam having a combination of elements, wherein the following additives are used in combination:

(B) 3-50 parts by weight of a melamine-based flame retardant having an average particle diameter of 30-60 μm;

(C) 5-35 parts by weight of an additive-type phosphorus-containing flame retardant having a molecular weight of 350-600; and

(F) 0.1 to 3 parts by weight of a silicone foam stabilizer, with a surface tension of 20.5-22 mN/m at a temperature of 25°C and a silicon atom content not exceeding 4.7% by weight.

By using the foregoing additives in a specific ratio, even when a general-purpose polyol and a polyisocyanate are used (i.e., a polyol and polyisocyanate having no special limitations), a flame-retardant polyurethane foam is obtained that meets the flame-retardant standards of not only CAL 117, but also the more strict British standard, British Standard 5852.

Inherent anticipation requires inevitable necessary results. Speculation, possibility, or probability are inadequate. Inherency also requires a factual predicate that demonstrates unequivocably that what is alleged to be inherent is inherent. *In re Spormann*, 150 USPQ 449, 552 (CCPA 1967). ("Obviousness cannot be predicted on what is unknown.")

Applicants courteously submit their claims are novel and would not have been anticipated by a person of ordinary skill in the art. The references do not support the rejections.

None of the applied references discloses a flame-retardant, flexible polyurethane foam having the foregoing combination of additives used in a specific ratio as set forth in amended independent claim 1. A comparison of Applicants' claimed composition and those of the cited references is provided below:

Claims 6-10 of Grace recite a flame-retardant, flexible polyurethane foam, comprising:

(f) about -25 wt% of melamine, wherein the melamine has a mean particle size of about 40 μm or more (based on the weight of the foam);

(g) about 1-10 wt% of halogenated phosphate ester flame retardants other than a melamine flame retardant (based on the weight of the foam); and

(e) a surfactant.

Grace discloses that non-ionic surfactants, such as silicones, are not particularly desirable. See column 7, line 60, through column 8, line 4. While the Grace surfactant may superficially resemble Applicants' silicone foam stabilizer, the Grace surfactant is not a low activity silicone, as in the presently claimed invention. See page 18, lines 9-19, of the present specification. Furthermore, Grace makes no mention of the British Standard 5852; the only inflammability test conducted in Grace is the CAL 117.

Applicants achieve the above-noted synergistic effects by using a specific melamine-based flame retardant, a specific additive-type phosphorus-containing flame retardant, and a specific silicone foam stabilizer (low activity silicone) at a specific ratio, thereby improving flame

retardancy. Accordingly, Applicants provide a flame-retardant polyurethane foam that meets the strict criteria of British Standard 5852, even when a general-purpose polyol and a polyisocyanate are used.

While Ricciardi also discloses a flexible, flame-retardant polyether polyurethane foam prepared from melamine and a phosphorous ester flame-retardant additive, as well as a general-purpose polyol and isocyanate compound, Ricciardi does not specify the components of the foam in such a way as to achieve the features of Applicants' presently claimed invention. In fact, the level of flame retardancy obtained by Ricciardi is substantially the same as when a phosphorous ester is used alone (see claim 1). When a general-purpose polyol is used together with a general-purpose isocyanate compound, it would have been problematic, and extremely difficult at best, to meet the criteria defined in the flame-retardancy standards of British Standard 5852 through the use of a phosphorous ester alone (page 1, line 24, through page 2, line 7, of the specification). Accordingly, Applicants' invention is markedly superior in terms of flame retardance when compared to Ricciardi.

Haas discloses a process for the preparation of flame-retardant polyurethane foams using a polymer-modified polyol (claims 1 and 4-7). In contrast, Applicants' inventive composition does not require the use of the Haas specifically modified polyol. As set forth in the present specification at page 3, lines 13-19, Applicants' composition is capable of providing sufficient flame retardancy, even when a general-purpose polyol is used. Accordingly, Applicants' presently claimed invention is fundamentally different from the Haas composition.

Smiecinski merely describes a method of producing a flame-retardant, flexible polyurethane foam article, wherein carboiimide-uretonimine-modified diphenylmethane diisocyanate is present in an organic isocyanate as an essential component (see claim 1). In other words, Smiecinski provides flame-retardant polyurethane foam exhibiting improved flame foam (i.e., polyol and isocyanate) so that the criteria of British Standard 5852 can be met.

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In contrast, Applicants' presently claimed invention does not limit the isocyanate used and a general-purpose polyol is used. In other words, Applicants' presently claimed invention does not unduly restrict the materials for the flexible polyurethane foam (such as to polyol species or specific diisocyanate species), instead by using a specific melamine-based flame retardant, a specific additive-type phosphorus-containing flame retardant, and a specific silicone foam stabilizer (low activity silicone) in a specific combined ratio, the flame retardancy of the flexible polyurethane foam is improved by such synergistic components of the flexible polyurethane foam, without changing the polyol and the isocyanate, which are main components. By specifying the types and amounts of additives, Applicants discovered that flame retardance is improved. This is an advantageous characteristic of the presently claimed invention and demonstrates that the presently claimed invention is fundamentally different from the Smiecinski composition. While both Applicants and Smiecinski aim to provide flame-retardant polyurethane foam that can satisfy the criteria of British Standard 5852, Applicants' invention clearly is patentably distinct in its way and means of achieving this object.

GB 2,369,825 is passingly similar to Applicants' presently claimed invention only in that it provides flame-retardant polyurethane foam that is prepared using melamine in combination with other flame retardants. However, the flame-retardant polyurethane foam of GB '825 is prepared using a mixture of two types of polyols having different structures, OH numbers, etc. See the Abstract; page 3, lines 8-24, of the specification; and claim 1. GB '825 limits the polyols in order to improve the flame retardancy and uses melamine in combination with other flame retardants, so that flame-retardant polyurethane foam that can satisfy the criteria of British Standard 5852 is obtained.

In contrast, the presently claimed invention does not limit the polyols and uses inexpensive general-purpose polyols. The presently claimed invention provides flame-retardant polyurethane foam that can satisfy the criteria of British Standard 5852, whose flame retardance is improved by the synergistic effects of using specific average particle diameter, additive-type

phosphorus-containing flame retardant having a specific molecular weight, and specific silicone foam stabilizer (low activity silicone). In other words, in GB' 825, the flame retardancy is improved by limiting the materials for the flexible polyurethane foam (i.e., the polyols), but in the present invention, the flame retardance is improved by specifying the types and amounts of additives. Consequently, the present invention fundamentally differs from GB '825. While the present invention and GB '825 both aim to provide flame-retardant polyurethane foam that can satisfy the criteria of British Standard 5852, they clearly are different in the way and means of achieving that object. The differences are fundamental.

WO 03/078497 discloses that the melamine has a minimum particle diameter of about 0.83 μm, a maximum particle diameter of about 74 μm, and an average particle diameter of about 12.28 μm (paragraph [0017]). In contrast, the melamine-based flame-retardant used in Applicants' presently claimed invention has an average particle diameter of 30-60 μm, which clearly is different from the disclosure of WO 03/078497. As shown in Example 1 and Comparative Example 3 in Table 2 of the present specification, when the average particle diameter of melamine is 45 μm (i.e., within the range of the particle diameter of the present invention), the final product can meet the criteria of both British Standard 5852 and CAL 117 (Examples 1 and 2). When the average particle diameter is 12 μm (i.e., the particle diameter defined by WO '497, the final product can meet the requirements of the CAL 117 vertical burning test (Comparative Example 3), but not British Standard 5852 (Comparative Example 1). WO '497 discloses the flammability standards of CAL 117, but not those of British Standard 5852, which is a tacit admission of its shortcomings.

As described above, the presently claimed invention differs from all of the disclosures of the cited documents, and the present invention is not anticipated by any of the cited documents.

In view of the foregoing, Applicants' inventive composition for a flame-retardant flexible polyurethane foam, as set forth in amended independent claim 1, is not anticipated by Grace, Ricciardi, Haas, Smiecinski, GB 2,369,825, or WO 03/078497. Claims 2, 3, and 6-9

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depend from independent claim 1 and are allowable for at least the same reasons, as well as for the additional limitations provided by these claims. Accordingly, reconsideration and withdrawal of the outstanding rejections are respectfully requested.

Applicants hereby request a three-month extension of time in which to file this reply. The Commissioner is hereby authorized to charge the $1050 three-month extension fee to Deposit Account No. 06-1135. If in error, the Commissioner is further authorized to charge any additional fee required to effect entry and consideration of this reply, including application processing, extension, and extra claims fees, to said Deposit Account.

Respectfully submitted,

FITCH, EVEN, TABIN & FLANNERY

Kendrew H. Colton, #30,368

Customer No. 42798
One Lafayette Centre
1120 - 20th Street, NW
Suite 750, South
Washington, DC 20036
(202) 419-7000 (telephone)
(202) 419-7007 (telecopier)
KHC:rk

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